supplementary apertures in the form of an arch along the sutural margin of each chamber. *Pseudoeponides* Uchio has supplementary apertures similar to those of *Discopulvinulina* along the sutural margins, and in addition has slits on the central portion of each chamber, but on the dorsal side. The present genus does not have dorsal supplementary apertures, and the ventral ones are not at the sutural margins, but across the central portion of the chambers.

Paumotua terebra (Cushman)

Figs. 1a–c

Eponides terebra Cushman, Contr. Cushman Lab. Foram. Res. **9**, pt. 4: 89, pl. 10, figs. 1a–c. 1933.

Test free, trochoid, planoconvex to concavo-convex, dorsal side with a low spire, periphery with a rounded keel; all of the 2½ whorls visible dorsally, only the 8–10 chambers of the final whorl visible ventrally, but these do not reach the center but leave a wide open umbilicus, chambers increasing very gradually in size as added; sutures distinct, curved backward on the dorsal side, raised and thickened, more gradually curved ventrally, and slightly depressed; wall calcareous, hyaline, surface smooth; aperture ventral, forming a reentrant about one-third the distance from the periphery to the umbilicus and one or more rounded to somewhat elongate supplementary apertures on the ventral side in line with the main aperture but away from the apertural margins of the chambers, increasing in size and number as the chambers enlarge, and remaining open throughout.

Greatest diameter of holotype 0.86 mm, least diameter 0.78 mm, height of spire 0.39 mm, greatest diameter of paratype 0.52 mm, height of spire 0.21 mm. Greatest diameter of hypotype 0.53 mm, height of spire 0.18 mm.

Remarks.—Cushman noted the peculiar supplementary apertures in his original description of the species, which was apparently based on the holotype and a single paratype. One additional unlabelled specimen was found in the collection, and all three specimens from two stations show identical development of these supplementary apertures, which could not therefore be accidental. As this feature is not found in *Eponides* Montfort, the present species is regarded as belonging to a distinct genus.

Types and occurrence.—Holotype (USNM 26160) from *Albatross* station H. 3931, Anu Anuraro Atoll, southeast ½ mile, Paumotu Islands, depth 405 fathoms, bottom temperature 42.5°F.; bottom coral sand, pteropod ooze, and manganese particles. Paratype (USNM 26161) and unfigured hypotype (USNM P. 828) from *Albatross* station H. 3910, southwest point Aki Aki, east 1 mile, Paumotu Islands, depth 377 fathoms; bottom temperature 43.0°; bottom coral sand.

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ZOOLOGY.—*Fresh-water triclads (Turbellaria) of the Rocky Mountain National Park region, Colorado.* Roman Kenk. (Communicated by Fenner A. Chace, Jr.)

The present paper is a report on the results of a brief investigation of aquatic habitats in the Rocky Mountain National Park region, Colorado. The short time at my disposal, one week, did not permit an intensive coverage of the area studied, and only places accessible by road could be visited. I am indebted to Hillory A. Tolson, John E. Doerr, David H. Canfield, and Ed Alberts, of the National Park Service, for facilitating my field work in Colorado; and to Prof. Edward G. Reinhard, Catholic University, and Dr. Doris M. Cochran, Smithsonian Institution, for kindly extending to me the use of their laboratory and office facilities in Washington, D. C.

The triclad fauna of Colorado is very little known. Ward (1904: 143) reports that numerous immature, unidentified planarians were present in a bottom haul from Dead Lake, a small water basin south-southeast of Pikes Peak. Cockerell (1927: 242) states that a dark-colored planarian is not rare in mountain springs of Colorado and that, in

1922, *Planaria maculata* [*Dugesia tigrina* (Girard)] and *P. dorotocephala* [*Dugesia dorotocephala* (Woodworth)] were liberated in the pond on the University of Colorado campus in Boulder. A species from Boulder was identified by Hyman (1931b: 327) as *Phagocata velata* (Stringer). These meager data appear to be the only records of Colorado triclads found in literature.

My collections in the Rocky Mountain National Park region yielded only one triclad species, apparently identical with that observed by Cockerell, *Polycelis coronata.*

Polycelis coronata (Girard, 1891)

A summary of previous literature data on *Polycelis coronata* has been presented by Hyman (1931a). The species was first collected by Joseph Leidy in 1877 and was later described, apparently from Leidy's notes and material, by Girard (1891, 1893) under the name *Phagocata coronata.* Hallez (1894: 179) considered the species to be possibly identical with the European *Polycelis nigra* (O. F. Müller). The correct taxonomic position of the species was established by Hyman (1931a), who furnished a good description of its anatomy and natural history.

The present report aims to supplement Hyman's data and to carry out a comparison of *Polycelis coronata* with another, very similar, species of the same genus occurring on the North American Continent, *P. borealis* (cf. Kenk, in press).

External characters.—Mature, quietly gliding specimens measure up to 13 mm in length and up to 1.5 mm in width. Hyman saw many individuals 15 to 20 mm long and considers this to be the maximum length. The anterior end is truncated, with convex frontal margin, and the sides of the head project as a pair of broad, usually pointed auricles (Fig. 1). Hyman, in her figure 1, indicates that the tip of the auricles is rounded; it appears, indeed, that the shape of the auricles varies to some extent according to the physiological state of the animal. Active individuals in lively locomotion show the tips of the auricles more distinctly pointed than do less active animals moving sluggishly. In quiet gliding, the auricles are held lifted obliquely above the substratum. Behind the auricles there is a slight narrowing of the body; posteriorly the width increases gradually until the maximum width is reached in the region of the pharynx; behind the pharynx, the lateral margins of the body converge again to meet in a bluntly pointed posterior end.

The eyes are numerous and are arranged in a curved zone, more than one row wide, along the frontal margin and the anterior parts of the lateral margins. The zone or band of eyes may be narrowed as it crosses the base of the auricles, as Hyman observed; in some individuals, however, there is no distinct narrowing of the band in that place. Behind the head, the band of eyes tapers to a single row extending backward for about one-fourth to one-third of the prepharyngeal region.

The general color of the dorsal side is usually uniform, grayish brown to almost black. Occasionally one may see an indistinct lighter midline in the prepharyngeal part of the body and a lighter field above the pharynx. The color of the ventral side is lighter.

The pharynx is inserted at, or a short distance behind, the middle of the body. It is of considerable length, measuring from one-sixth to one-fourth the length of the body. The length of the

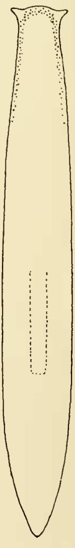

Fig. 1.—*Polycelis coronata*, sketch of the living animal, × 8.

postpharyngeal region varies considerably, particularly in asexual animals. When the animals are in the state of asexual reproductive activity, the postpharyngeal parts of the body may be very short and all stages of regeneration of the posterior region may be seen.

Polycelis coronata moves by gliding only. No "crawling" locomotion has been observed.

Reproductive system.—The testes occupy two short zones in the prepharyngeal region, one on each side of the anterior intestinal trunk, and are situated on the ventral side as is typical of the genus *Polycelis.*

The copulatory organs (Fig. 2) furnish the best characters distinguishing *Polycelis coronata* from other species of the genus. The genital aperture leads into a small, spherical cavity, the common genital atrium (*ac*), which receives, from the left side, the duct of the copulatory bursa (*bd*) and connects anterodorsally with a wider cavity, the male atrium (*am*). The walls of both atria are lined with a cubical epithelium under which there are two muscular layers, one composed of circular and the other of longitudinal fibers.

The penis consists of a large ellipsoidal bulb and a short broad papilla (*pp*). The penis bulb has a thick wall composed of a meshwork of muscle fibers arranged in concentrical layers and running in various directions. This muscular wall is pierced by radial canals containing the outlets of glands emptying into the cavity of the bulb. The secretion of these glands is stained very slightly with eosin. The voluminous, elongated cavity of the penis bulb, or seminal vesicle (*vs*), is lined with a tall epithelium of glandular nature. In fully mature specimens, the epithelium forms villuslike processes projecting into the vesicle.

The two vasa deferentia, after penetrating the wall of the penis bulb, open into the seminal vesicle near its middle. Frequently, but not in all specimens, the opening of the left vas deferens (*vds*) is at a level posterior to the opening of the right vas deferens (*vdd*).

The lumen of the seminal vesicle continues posteriorly into the wide canal of the short penis papilla. The epithelium of this canal is cubical and nonglandular. The canal could be interpreted as an ejaculatory duct, but is apparently devoid of a proper muscle coat. The outer epithelium of the papilla is cubical, contains only few nuclei (part of the nuclei may be depressed?) and has two underlying muscular layers, a circular one and a longitudinal one.

The two oviducts bend dorsally and medially at the level of the penis bulb and unite at a point posterodorsal to the male atrium. The common oviduct (*odc*), formed by their fusion, proceeds ventrally, curving along the wall of the atrium, and opens into the atrial cavity at the junction of the male and common atria. The terminal portions of the paired oviducts and the common oviduct receive outlets of numerous eosinophilic shell glands.

The copulatory bursa (*b*) is a large, lobed sac situated between the wall of the pharyngeal

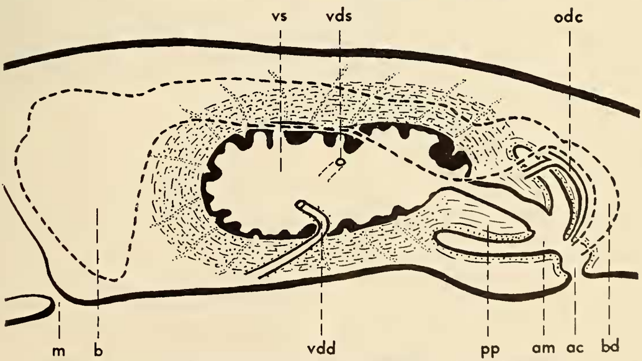

Fig. 2.—*Polycelis coronata*, diagram of the copulatory organs in sagittal section, ×80. (*ac*, common atrium; *am*, male atrium; *b*, copulatory bursa; *bd*, bursa stalk; *m*, mouth; *odc*, common oviduct; *pp*, penis papilla; *vdd*, right vas deferens; *vds*, left vas deferens; *vs*, seminal vesicle.)

pouch and the penis bulb. Its dorsal part continues, somewhat to the left of the midline, into a wide duct with irregular outline, which runs posteriorly on the left of the penis. At the level of the male atrium, the structure of the wall changes abruptly. The duct becomes a highly muscular tube (*bd*) running ventrally and opening, from the left side, into the common atrium. The sac of the bursa and the anterior part of its outlet have the same histological structure. The cells of their epithelial lining are large glandular cells; fine muscle fibers, such as are found in other species coating the bursa sac, coat both sections externally, as mentioned by Hyman. It appears, therefore, that the sac and the greater part of the duct correspond to a true bursa and that the bursa stalk is represented by the short muscular terminal part (*bd*) of the duct (called vagina by Hyman). The epithelium lining the terminal section is cubical and ciliated and is marked off sharply from the secretory lining of the anterior section. The thick muscle coat consists of circular and longitudinal fibers.

Ecology.—*Polycelis coronata* is a common inhabitant of mountain streams and mountain lakes in the Rocky Mountain National Park region. It was collected in about 50 percent of the suitable localities examined in the area, and its presence may have been overlooked in places where no thorough collections could be made. It is generally found attached to the undersides of stones. The temperatures of the habitats of the species ranged, in the latter part of September, from 4.4° to 10.9°C.

The great majority of the animals collected were asexual. Many of the asexual specimens exhibited regenerating posterior ends or regenerating heads, indicating that asexual reproduction by fission was taking place. The relative proportion between the numbers of individuals in the various reproductive phases was reflected in a collection made in Glacier Creek: of 39 specimens collected, 2 were sexually mature, 20 lacked sex organs but showed signs of recent fission, and 17 were asexual without evidence of reproduction. Hyman (1931a: 124, 131), on the other hand, states that, when she collected the species in South Dakota in the early fall, many of the specimens secured were in full sexual maturity and that there were no indications of the occurrence of fission. It is well known, however, that the same species of freshwater triclads may show different habits of reproduction in different areas of their occurrence.

Distribution.—Girard's (1891, 1893) specimens of *Polycelis coronata* had been collected in a spring near Fort Bridger in southwest Wyoming. Hyman (1931a: 124) found the species in a stream near Deadwood and in a brook near the State Game Lodge, both in the Black Hills, S. Dak. It appears that Hyman later obtained material from additional localities, since, in a recent paper (1951: 162), she indicates the range of the species as "Black Hills of South Dakota to the northwest Pacific coast."

In Colorado, *Polycelis coronata* was collected in clear, fast mountain streams in or near the Rocky Mountain National Park, on both sides of the Continental Divide. It was also taken in a clear mountain lake, Poudre Lake. The habitat altitudes were between 7,000 and 10,700 feet.

Thompson River: (a) East of the town of Estes Park, near junction of highways U. S. 34 and Colorado 66; (b) in Moraine Park, above bridge on Bear Lake Road.

North Fork of Thompson River, 1 mile below Glen Haven (Fig. 3). One specimen, on 4 slides, U. S. N. M. no. 23679.

Glacier Creek (tributary of Thompson River), near Glacier Basin camping ground.

Fall River (tributary of Thompson River), where it enters the town of Estes Park.

Tributaries of Fall River, crossing Fall River Road: Roaring River and Chiquita Creek.

Streams of the St. Vrain Creek basin, crossing highway Colorado 7: North St. Vrain Creek, Willow Creek, Rock Creek, and Middle St. Vrain Creek.

Onahu Creek (tributary of Colorado River), below bridge on highway U. S. 34.

Tonohutu Creek, above its opening into Grand Lake.

Poudre Lake, on Trail Ridge Road (U. S. 34), altitude 10,700 feet, water temperature near shore, 7.3°C. (Fig. 4).

Miss Betty Locker, of the Rocky Mountain Laboratory, Hamilton, Mont., sent me samples of *Polycelis* collected in a cool spring (11°C., May) on Eastmoreland golf course in Portland, Oreg.; and on Skalkaho Pass (east of Hamilton), Ravalli County, Mont. These have been deposited in the U. S. National Museum (nos. 23787, 23788). Though no anatomical study of the specimens could be made, the external characters of the preserved specimens agree with *P. coronata*. The species undoubtedly has a wide distribution in the western states.

Taxonomic position.—The absence of adenodactyls and of an excessively developed muscle coat of the male genital atrium identifies *Polycelis coronata* as a member of the subgenus *Polycelis* (cf. Kenk, in press). The species has a very close external resemblance to *P. borealis* from Alaska. The two species cannot be distinguished on the basis of external characters alone; moreover, their ecological characteristics are identical, as both inhabit mountain streams and mountain lakes.

The two species are, however, clearly separated by the anatomy of their reproductive systems. *P. coronata* has a large, elongated penis bulb with a spacious seminal vesicle into which the vasa deferentia open from the sides, and a short papilla; in *P. borealis*, the bulb is spherical and less voluminous, the seminal vesicle smaller, the openings of the vasa deferentia anterolateral, and the penis papilla comparatively larger. The copulatory bursa of *P. coronata* has a characteristic feature not seen in other species of the genus: the bursa extends posteriorly, without changing its histological structure, as a duct which connects with a true muscular bursa stalk at the level of the male atrium. In *P. borealis*, as in other species, the entire duct of the bursa is equipped with a thick coat of muscle fibers.

Zoogeographical note.—The genus *Polycelis* is primarily distributed over Europe and Asia where it is represented by a considerable number of species. The two North American species, *P. coronata* and *P. borealis*, are both confined to the western part of the continent, the western United States and Alaska. It appears probable that both species have, in the geological past, entered the continent from Asia, over the Alaskan land bridge (Kenk, in press). The range of distribution of either species is not fully known. Their areas may adjoin, or even overlap, in the Canadian Rockies.

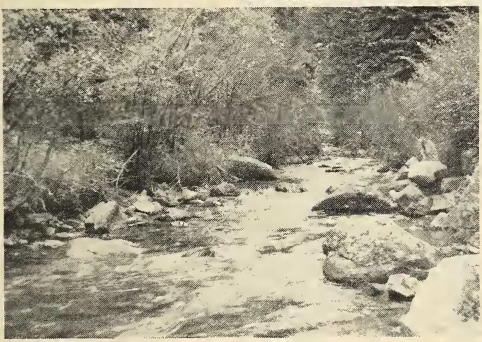

Fig. 3 (below).—North Fork of Thompson River, 1 mile below Glen Haven, Colo. *Polycelis coronata* on the undersides of stones.

Fig. 4 (above).—Poudre Lake, on Trail Ridge Road, Rocky Mountain National Park, Colo. *Polycelis coronota* under stones along shore.

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PROCEEDINGS OF THE ACADEMY

54TH ANNUAL MEETING

The 54th Annual Meeting, concurrently with the 384th monthly meeting of the Academy, was held as a dinner meeting in the ballroom of Hotel 2400 on the evening of January 17, 1952. Vice-President J. J. Fahey presided.

After the dinner Dr. Fahey called the meeting to order. The minutes of the 53d Annual Meeting were approved as published in the Journal **41**: No. 7, 238–244. July 1951.

The Secretary read a letter to the Board of Managers dated January 12 from President Smith, who has retired and is now living in Florida. He expressed his appreciation for the cooperation received from the members of the Academy during his term of office, and proffered his best wishes for a successful year.

The following reports by officers, auditors, and tellers were presented and approved:

REPORT OF THE SECRETARY

During the Academy year—January 19, 1951, to January 17, 1952—62 persons were elected to regular membership, including 56 to resident and 6 to nonresident (125 were elected last year). Of these, 27 resident and 5 nonresident qualified for membership. Twenty-two resident and 5 nonresident members elected in the preceding Academy year qualified during the year just ended. Six elected to resident membership on January 14, 1952, have not yet been notified of their election. The new members were distributed among the various sciences as follows: 13 in physics, 12 in chemistry, 6 in bacteriology, 5 in pathology, 4 each in mathematics and physiology, 3 in parasitology, 2 each in botany and zoology, and 1 each in animal husbandry, entomology, hydrography, mammalogy, metrology, nucleonics, pomology, and soil science. Two resident members, having retired from the gainful practice of their professions, were placed on the retired list entitled to privileges of active membership without further payment of dues. Eleven resident and four nonresident members resigned in good standing. Two resident members were dropped for nonpayment of dues.

The deaths of the following 11 members have been reported to the Secretary:

Maurice I. Smith, Bethesda, Md., on January 26, 1951.
Owen B. French, Lakewood, Ohio, on February 12, 1951.
Claribel R. Barnett, Washington, D. C., on March 6, 1951.
Henry Solon Graves, Brattleboro, Vt., on March 7, 1951.
Bailey E. Brown, Washington, D. C., on March 9, 1951.
William F. Allen, Portland, Oreg., on March 11, 1951.
Merrill Bernard, Washington, D. C., on April 13, 1951.
Earl K. Fischer, Washington, D. C., on August 3, 1951.
Daniel L. Hazard, Narragansett, R. I., on September 21, 1951.
Oscar B. Hunter, Washington, D. C., on December 19, 1951.
Rufus H. Sargent, Washington, D C., on December 28, 1951.

On January 17, 1952, the status of membership was as follows:

	Regular	*Retired*	*Honorary*	*Patron*	*Tota*
Resident	589	56	0	0	645
Nonresident	190	33	10	0	233
Total	779	89	10	0	878

The net changes in membership during the past year are as follows:

	Regular	*Retired*	*Honorary*	*Patron*	*Total*
Resident	+16	−1	0	0	+15
Nonresident	+17	−1	0	0	+16
Total	+33	−2	0	0	+31

During the Academy year 1951 the Board of Managers held 9 meetings with an average attendance of 18. The following summarizes items of interest in connection with Board Meetings: